IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A computerized method for dental imaging comprising:

receiving a plurality of two-dimensional images of a oral cavity; and

generating at least one three-dimensional image of the oral cavity from the plurality of two-dimensional images, including:

generating shape-from-shading (SFS) data ~~and range data~~ using [[t he]] the plurality of two-dimensional images;

generating range data using a digitizing arm; and

processing the SFS data and the range data to generate the at least one three-dimensional image.

2. (Original) The computerized method of claim 1, wherein the plurality of two-dimensional images further comprises a plurality of two-dimensional optical images.

3. (Original) The computerized method of claim 1, further comprising:

constructing a physical cast of the oral cavity from the three-dimensional image.

4. (Original) The computerized method of claim 1, further comprising:

generating the plurality of two-dimensional images of the oral cavity from a common reference point in three-dimensional space.

5. (Previously Amended) The computerized method of claim 1, wherein processing the SFS data and the range data to generate the at least one three-dimensional images comprises:

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the at least one three-dimensional image of the oral cavity.

6. (Original) The computerized method of claim 5, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

7. (Original) The computerized method of claim 5, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

8. (Currently Amended) A computer-readable medium having computer-executable instructions to cause a computer to perform a method comprising:

receiving a plurality of two-dimensional optical images of an oral cavity; and

generating at least one three-dimensional image of the oral cavity from the plurality of two-dimensional images, including:

generating shape-from-shading (SFS) data ~~and range data~~ using the plurality of two-dimensional images;

generating range data using a digitizer arm; and

processing the SFS data and the range data to generate the at least one three-dimensional image.

9. (Original) The computerized method of claim 8, further comprising:

constructing a physical cast of the oral cavity from the three-dimensional image.

10. (Original) The computerized method of claim 8, further comprising:

generating the plurality of two-dimensional images of the oral cavity from a common reference point in three-dimensional space.

11. (Previously Amended) The computerized method of claim 8, wherein processing the SFS data and the range data to generate the at least one three-dimensional images comprises:

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the at least one three-dimensional image of the oral cavity.

12. (Original) The computerized method of claim 11, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

13. (Original) The computerized method of claim 11, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

14. (Original) A three-dimensional digital image of a human oral cavity produced by the process comprising:

generating a plurality of two-dimensional optical images of the oral cavity from a common reference point in three-dimensional space;

generating shape-from-shading data from the plurality of two-dimensional images using a shape-from-shading process, the shape-from-shading data comprising a first plurality of three-dimensional points;

generating range data comprising a second plurality of three-dimensional points from the plurality of two-dimensional images using a range-data process;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the one three-dimensional image of the oral cavity.

15. (Original) The three-dimensional digital image of a human oral cavity of claim 14, produced by the process wherein generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters.

16. (Original) A system for dental diagnosis comprising:

a processor; and

software means operative on the processor for generating a three-dimensional image of a human jaw, including generating shape-from-shading data that is generated from a direction of an illuminant of the jaw that is estimated in reference to camera intrinsic parameters.

17. (Original) A computerized system comprising:

a digitizer providing five degrees of freedom, having an arm;

a charge coupled device camera, rigidly mounted on the arm of the digitizer; and

a computer, operably coupled to the digitizer and the camera; receiving coordinate measurements from the digitizer and a plurality of two-dimensional images from the camera; and generating a digital three-dimensional model from the coordinate measurements and from the plurality of two-dimensional images.

18. (Original) The computerized system of claim 17, further comprising:

a rapid prototyping machine operably coupled to the computer, receiving the digital three-dimensional model and generating a physical model of the digital three-dimensional model.

19. (Original) The computerized system of claim 17, further comprising:

a display operably coupled to the computer, receiving the digital three-dimensional model and generating an image of the digital three-dimensional model.

20. (Previously Amended) The computerized system of claim 17, the computer further comprises:

a computer readable medium comprising means of:

generating shape-from-shading data from the plurality of two-dimensional images using a shape-from-shading process, the shape-from-shading data comprising a first plurality of three-dimensional points;

generating range data comprising a second plurality of three-dimensional points from the plurality of two-dimensional images using a range-data process;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the image of the three-dimensional model.

21. (Previously Presented) A computerized method for dental imaging comprising:

receiving a plurality of two-dimensional images of a oral cavity; and

generating shape-from-shading data from the plurality of two-dimensional images using a shape-from-shading process, the shape-from-shading data comprising a first plurality of three-dimensional points; and

generating range data comprising a second plurality of three-dimensional points from the plurality of two-dimensional images using a range-data process;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding at least one three-dimensional image of the oral cavity.

22. (Previously Presented) The computerized method of claim 21, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

23. (Previously Presented) The computerized method of claim 21, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

24. (Previously Presented) A computer-readable medium having computer-executable instructions to cause a computer to perform a method comprising:

receiving a plurality of two-dimensional optical images of an oral cavity; and

generating shape-from-shading data from the plurality of two-dimensional images using a shape-from-shading process, the shape-from-shading data comprising a first plurality of three-dimensional points;

generating range data comprising a second plurality of three-dimensional points from the plurality of two-dimensional images using a range-data process;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding at least one three-dimensional image of the oral cavity.

25. (Previously Presented) The computerized method of claim 24, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

26. (Previously Presented) The computerized method of claim 24, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

27. (New) A computerized method for dental imaging comprising:

receiving a plurality of two-dimensional images of a oral cavity; and

generating at least one three-dimensional image of the oral cavity from the plurality of two-dimensional images, including:

generating shape-from-shading (SFS) data and range data using the plurality of two-dimensional images;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the at least one three-dimensional image of the oral cavity.

28. (New) The computerized method of claim 27, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

29. (New) The computerized method of claim 27, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

30. (New) A computer-readable medium having computer-executable instructions to cause a computer to perform a method comprising:

receiving a plurality of two-dimensional optical images of an oral cavity; and

generating at least one three-dimensional image of the oral cavity from the plurality of two-dimensional images, including:

generating shape-from-shading (SFS) data using the plurality of two-dimensional images;

generating range data using a digitizer arm;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the at least one three-dimensional image of the oral cavity.

31. (New) The computerized method of claim 30, wherein the generating shape-from-shading data further comprises:

estimating the direction of the illuminant from the plurality of two-dimensional images, in reference to camera intrinsic parameters; and

determining a solution to a brightness equation, yielding the shape-from-shading data comprising a first plurality of three-dimensional points.

32. (New) The computerized method of claim 30, wherein the fusing the range data to the shape-from-shading data further comprises:

calculating the error difference in available depth measurements of the range data and the shape-from-shading data;

approximating a surface the fits the error difference, yielding an approximated surface; and

correcting the shape-from-shading data from the approximated surface, yielding fused data comprising a third plurality of three-dimensional points.

33. (New) A computerized system comprising:

a digitizer providing five degrees of freedom, having an arm;

a charge coupled device camera, rigidly mounted on the arm of the digitizer; and

a computer, operably coupled to the digitizer and the camera;

receiving coordinate measurements from the digitizer and a plurality of two-dimensional images from the camera; and

generating a digital three-dimensional model from the coordinate measurements and from the plurality of two-dimensional images, the computer further including:

a computer readable medium comprising means of:

generating shape-from-shading data from the plurality of two-dimensional images using a shape-from-shading process, the shape-from-shading data comprising a first plurality of three-dimensional points;

generating range data comprising a second plurality of three-dimensional points from the plurality of two-dimensional images using a range-data process;

fusing the range data to the shape-from-shading data, yielding fused data comprising a third plurality of three-dimensional points;

registering the fused data, yielding registered data comprising a fourth plurality of three-dimensional points; and

triangulating the registered data, yielding the image of the digital three-dimensional model.